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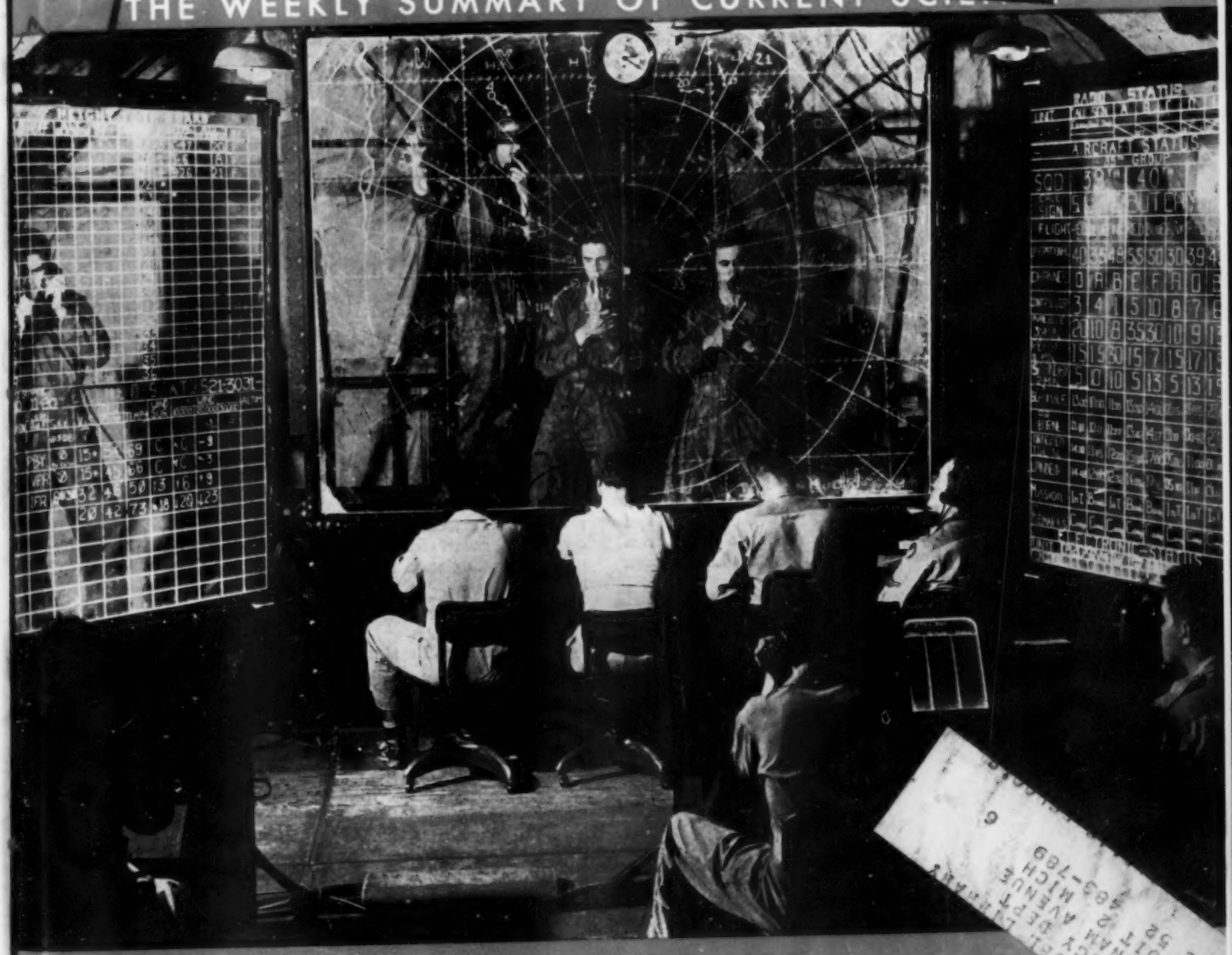
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Plane Tracking

See Page 154

A SCIENCE SERVICE PUBLICATION

ASTRONOMY

Milky Way Larger

Eight hundred million billion miles is new estimated diameter for the Milky Way galaxy of which our sun is a star. Measurement based on Cepheid variables.

➤ THE MILKY WAY galaxy to which our earth, the sun and all the stars in our pinwheel part of the universe belong has a hazy envelope that extends farther into the depths of space than astronomers have realized.

A corona of stars about four hundred million billion miles in radius is now believed to completely surround our watch-like system. This makes our galaxy almost eight hundred million billion miles across.

This new estimate of the size of our galaxy has just been completed by Dr. Harlow Shapley, director of Harvard College Observatory, and Ann B. Hearn, also of the observatory. Their findings will be reported in a forthcoming issue of the *Proceedings of the National Academy of Sciences.*

The core of the Milky Way system—our pinwheel grouping of stars—is about ten times as broad as it is thick. We are located in an outer spiral arm, yet many stars in the thin scattering of stars called the corona are fully as far from us as we are from the center of our galaxy.

The far-away stars in our galaxy selected for estimating the extent of the corona are variable stars called Cepheids. All the chosen stars periodically get brighter, then fade, in less than a day. The luminosities of such stars have already been worked out, calculations being based upon the fact that the shorter a Cepheid's period, the less its average brightness. With this key to the star's true brightness, it was possible to estimate its distance by studying its apparent brightness.

All of the selected stars are on the borders of the Milky Way, in Taurus the bull, Auriga the charioteer, Perseus, Orion the great hunter and neighboring constellations. This is the opposite direction in the heavens from the constellation of Sagittarius the archer, where the center of our galactic system is located.

These stars were all found to be members of our stellar corona and not to belong to the central celestial merry-go-round which carries us around the hub of the universe every two hundred million years. Instead of whirling around the center, these stars may have oscillatory motions with respect to the nucleus.

The corona to which these stars belong extends considerably beyond the radius of 50,000 light years, the estimate now accepted for the radius of the flattened discoid part of our galactic system. A dozen to 15 stars have been found to be much farther away from the center than this. Several of the stars are almost 60,000 light years from the hub of our universe, and one is over 65,000 light years away, Dr. Shapley and Miss Hearn found.

The further out one explores from the edge of our pinwheel system, the less numerous the stars in the corona become. This faint sprinkling of stars therefore contributes little to the total mass of our galaxy, most of which is concentrated near its center.

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BIOPHYSICS

Thigh Shields Protect Against Radiation

➤ LEAD SHIELDS on the thighs give protection against radiation, at least to one strain of mice, Drs. Henry S. Kaplan and Mary B. Brown of Stanford University School of Medicine, San Francisco, find.

Lead thigh shields appear to be impractical for human protection against atomic radiation as the lead vests for spleen shielding that earlier experiments showed also protected mice.

The point of the Stanford experiments, however, as reported in *Science* (Aug. 22), is that apparently any shielding that protects bone marrow is helpful against radiation injury.

The mice in the thigh-shield experiments were a strain of C57 blacks which consistently get tumors of the thymus gland as a result of radiation over the entire body. With the lead shields on one thigh, tumors did not develop. At first the animals showed the same injury to their thymus glands as mice without lead shields under irradiation. But the glands of the thigh-shielded mice recovered much faster.

The marrow in the shielded thigh bone apparently was able to provide enough protection against the radiation damage.

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PHARMACOLOGY

Test Tells if Alcohol Breath Really Is Killed

➤ A METHOD for telling whether a deodorant will really kill an alcohol breath has been worked out by Dr. J. A. Campbell and associates at Purdue University School of Pharmacy, Lafayette, Ind. They reported it at the meeting of the American Pharmaceutical Association in Philadelphia.

The method is being tried also on chemicals intended to kill other odors. It might tell whether chlorophyll compounds can keep Fido from smelling doggy. Dr. Campbell and associates hope it will give a "standardized, statistically sound technique" for testing such chemicals.

It depends on the effect of the alcohol vapor or other smells on the surface tension of a drop of water or other liquid.

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VIBRATION TESTS—The camera has here recorded the motion of a vibrating machine that tests new sea-going electronic gear by giving it, in Bell Telephone Laboratories, a shaking up that simulates the rolling of a destroyer's deck when the ship is battling rough seas.

GENERAL SCIENCE

Antivivisection Letters

➤ THOSE WHO think antivivisectionists are humanitarian or, at most, "harmless crackpots," are invited to judge for themselves from samples of antivivisectionist letters published by the National Society for Medical Research in Chicago.

Reason for publishing these letters is given by Dr. A. J. Carlson, University of Chicago physiologist and president of the National Society for Medical Research, as follows:

"The recent murder of an 18-year-old secretary in the offices of the American Physical Society brought home to many of us that the so-called 'harmless crackpots' are not always so harmless.

"Several years ago an antivivisectionist shot at, but did not hit, Dr. Harry Goldblatt, world renowned heart specialist of the Cedars of Lebanon Hospital in Los Angeles.

"Recently," Dr. Carlson stated, "antivivisectionists have threatened the lives of the vice president and two members of the faculty of the University of Illinois."

The most violent of the antivivisectionists letters could not be published, Dr. Carlson said, because "the language is so vile that the resultant publication could not be sent through the mail."

Here is a sample from those published:

"As the beautiful Xmas season rolls around why don't you do the world a favor, go in a corner and cut your throat you degenerate and perverted old Bitch. We scan the death notices daily hoping to see your name . . ."

Another antivivisectionist wrote: "You fancy yourselves men; I am a woman. But my great pleasure would be the experiment to end all experiments, and this would be made on you. I know a number of places on your bodies, which might be most sensitive to pain. I wonder if you would react to my satisfaction? Would you feel pain as horribly as it is possible to know pain? Would you remain conscious the correct length of time? Would we learn anything new in the art of torture . . ."

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GENERAL SCIENCE

Clock Ticks Twice a Year

➤ A CLOCK that "ticks" only twice each year was one of the objects entombed in a "living cornerstone" laid in Chicago on Sept. 3 in a building that was constructed in 1893 without a cornerstone.

The cornerstone was put in place by Chicago's Museum of Science and Industry, in an opening ceremony of the Centennial of Engineering.

Dedicated to the future, the cornerstone houses several objects that may reveal answers to questions now perplexing scientists. A hundred years from now, the cornerstone will be opened and the answers will be noted.

Meanwhile, a clock inside will tick off the years. The clock is built to "tick" once when Chicago's temperature rises above 85 degrees Fahrenheit. It will tick again the following winter when 15-degree winds are chilling Windy-City residents. A thermocouple acts as the clock's "pendulum."

Made of granite, the cornerstone also contains small amounts of dry hydrogen and oxygen in the proper proportions to form water. Some scientists say no reaction will take place in a hundred years because no catalyst will be present. Others believe a violent reaction will occur.

Oriental lotus seeds, noted for their ability to germinate after a long storage period, occupy one capsule. Future scientists should be able to predict more accurately the ability of seed to maintain germination qualities depending upon what the lotus seed does when planted in 2052.

Atomic scientists of the future will be interested in a lead block entombed in the cornerstone. It is coated with a thin layer of radioactive lead isotope. How deep will the radioactivity penetrate the block in 100 years? This question and others will be answered by time.

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AGRICULTURE

Airplane Spray Kills Mesquite for More Beef

➤ BEEF PRODUCTION jumps from 40% to several hundred percent when mesquite and other undesirable shrubs are removed from the grazing land, Dr. B. W. Allred of the U. S. Department of Agriculture told the Sixth International Grassland Congress meeting in State College, Pa.

A mixture of diesel oil and plant hormone sprayed from airplanes is giving "encouraging results" in wiping out the mesquite that has invaded over 100 million acres of the Southwest.

The plant hormone used is 2,4,5-T. The special mixture works either when sprayed on the foliage by airplane or when sprayed on the lower tree trunk, he reported. Ranchmen now rely on mechanical equipment, such as dozers, pushers, rooters and cables and chains, or kerosene and diesel oil poured around the tree soil to get rid of the pesky shrubs, but these methods are time-consuming and expensive.

Control of mesquite, he said, is difficult because so many birds, wild animals and livestock eat the woody plant's ripe bean pods and spread the seed widely.

The invasion of undesirable shrubs, such as mesquite, sagebrush and oak has taken place mostly within the last 100 years, when livestock grazing became widespread and wiped out native grasses. Woody plants such as mesquite, which then took over, use more water than does grass in producing a pound of dry matter, and they provide much less in the way of erosion protection for the soil.

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PHYSICS

New Time Standard

International Astronomical Union meeting in Rome expected to approve use of sidereal year instead of solar day as time standard for the world.

➤ A NEW standard of time may be adopted by astronomers now meeting in Rome, Italy.

If a new standard is adopted, it will not make any real difference to your watches and clocks. In fact, you will probably not even know when the standard is put into effect.

It is the sidereal year, the time it takes the earth to complete one trip around the sun, that will probably be adopted. It will replace the solar day, the time it takes the earth to complete a rotation about its axis.

This mean solar day is now used in checking quartz-crystal clocks employed by national time services that broadcast time signals by radio.

One of the delegates to the General Assembly of the International Astronomical Union now meeting in Rome is G. M. Clemence, director of the U. S. Nautical Almanac Office of the U. S. Naval Observatory. The Observatory constantly strives to issue more exact time signals for use throughout the nation. President of the commission for the study of time is Dr. Dirk Brouwer of Yale University Observatory, New Haven, Conn.

There was a time when the king's arm was a satisfactory standard of length. In fact, our familiar yard, foot and inch are derived directly from the human arm, foot and thumb joint. Also in the beginning man needed no better timekeeper than the daily motion of the sun, which he consulted first with the naked eye and later with a sundial.

But today much more accurate standards of measuring length and time are needed. We keep our standard meter-bar carefully hidden in the International Bureau of Weights and Measures at Paris, under conditions so carefully controlled that few people have ever seen it. However, we need an even more exact measure of time. The rate at which the earth turns on its axis every 24 hours is not quite exact enough.

The rate at which the earth rotates has been found to vary in three distinct ways:

1. The earth is gradually slowing down. It is doing so at such a rate that the length of the day is increased about 0.01 second in a century.

2. In the spring the earth rotates at a slower than average rate; in the autumn it rotates a little more quickly than usual. As a result, clocks in the autumn are about 0.06 second ahead of what they are in the spring.

3. The earth is sometimes ahead of its average orientation and sometimes behind. During the past two hundred years the accumulated error in the measure of time due to this irregular variation has amounted to as much as 30 seconds.

The question of a better standard of time than the mean solar second was referred to the General Assembly of the I.A.U. at its last meeting, held four years ago, by the International Bureau of Weights and Measures. It was considered in 1950 at an international conference on the fundamental constants of astronomy. At that time it was recommended that the sidereal year be officially adopted as the fundamental standard of time, to be used where the mean solar second is not suitable by reason of its variability.

The sidereal year has already been used as the fundamental standard of time by astronomers in special studies and found satisfactory. The nearness and rapid motion of the moon, not itself suitable for use as a fundamental standard of time, assist us in obtaining ready access to the sidereal year.

Astronomers and time experts feel sure it will be approved at the meeting as the new standard of time.

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250-MILE-AN-HOUR TIRE—R. D. Van Arnamn here prepares a new tire to make simulated high-speed landings in the Firestone Tire and Rubber Company's laboratory at Akron, Ohio.

• RADIO

Saturday, Sept. 13, 1952, 3:15-3:30 p.m., EDT

"Adventures in Science," with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. M. H. Trytten, director of the Office of Scientific Personnel of the National Research Council, and Dr. Bernard B. Watson, professional and scientific personnel specialist of the Defense Manpower Administration, Department of Labor, discuss "Science Youth Activities."

GENERAL SCIENCE

New Chemistry-Geology Building in Los Angeles

➤ PLANNED FOR what many persons believe will be the "Chemical Age" of the next half century, a new $4,500,000 Chemistry-Geology Building has been completed at the University of California at Los Angeles.

It is considered one of the best teaching and research plants of its kind in the West and is being made ready for classes of the fall term beginning next month.

The new building's chemistry facilities can train each term 1,500 freshmen, 375 students in quantitative analysis, 500 in organic chemistry, 90 in biochemistry and 150 in physical chemistry.

There is also laboratory capacity for 100 graduate students doing research and 13 post-doctoral research labs. In addition, there are 24 office-laboratory suites for the research work of staff members.

The geology wing contains modern classroom-laboratories, research laboratories, seminar rooms, a large geology library, a museum for displaying rocks, minerals and fossils, and space for the Institute of Geophysics.

The five-story structure with 160,000 square feet of space is, in fact, six separate buildings. They are separated by about six inches and give the group unusual protection from earthquakes.

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TECHNOLOGY

Fast Jet Landings With New Nylon Tires

➤ MILITARY AIRPLANES will be able to hit the runway at speeds of 250 miles an hour without tire trouble with a new nylon tire that incorporates construction principles already proved successful in automobile racing tires.

Developed by the Firestone Tire and Rubber Company, Akron, Ohio, the tire utilizes high-strength nylon and gum-dipped fabric incorporating racing-type construction and compounds. Already one of these new aviation tires has survived 50 simulated landings at 250 miles an hour in a laboratory test made by U. S. Air Force engineers. In these tests the aviation tire makes sudden contact with a rapidly revolving "grindstone" wheel.

Science News Letter, September 6, 1952

ELECTRONICS

Spot Unlicensed TV Sets

On display at the National Radio Show in London were the TV set detective, an electronic altimeter for pilots and a self-priming battery.

➤ AN ELECTRONIC detective has been built in London to track down and expose "criminal" television receiving sets operated without the license required by the British government.

On display at the 19th National Radio Show in London, the device is housed in a truck that can be moved about easily. It has three loop antennas fitted to the roof of the truck. The antennas pick up electromagnetic waves created by video set scanning coils. A comparison of the strengths of the signals received by the three antennas reveals the location of the unlicensed set.

Among other items on display during the show were an electronic altimeter for pilots, a stencil-cutting machine, a self-priming battery and a fireless way to heat-treat steel.

Using frequency-modulated radio waves, an altimeter can tell pilots whether they are five or 5,000 feet above the ground. The device requires no adjustments in the air and can be used by the pilot to the point of touch-down on the landing field.

An electric spark jumping from a needle-like point to special mimeograph stencils can reproduce practically any sort of printed matter from a photograph to a blueprint. An electric eye scans the original copy while the spark "cuts" the stencil. In principle, the process is similar to sending photographs by wire.

The problem of supplying adequate battery power to life-raft radio sets, even if the battery has been stored in the emergency raft for months or years, has been met by a self-priming battery. Its plates are sealed from the battery acid by a thin diaphragm. The diaphragm is pierced when the battery is needed. Battery voltage comes up to full strength in a few minutes.

Radio waves can heat small sections of one-inch steel rods to red-hot temperatures for instant quenching and metal hardening by means of an apparatus consisting of a seven-kilowatt radio frequency generator and a coiled copper water-cooled tube. The steel rod is inserted in the coil and the power is turned on. As soon as the steel section is hot, water is sprayed over the coil, quenching and hardening the steel.

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PALEONTOLOGY

Australian Fossil Link

Fossils show that millions of years ago, at varying periods, different animals migrated between Australia and New Zealand and Europe and America.

➤ MILLIONS OF years ago there was migration of lower animals between Australia and New Zealand and Europe and America, the Australian and New Zealand Association for the Advancement of Science meeting was told in Sydney.

Fossil discoveries in Australia have added greatly to the knowledge of one or two orders of early Cephalopod mollusks and it is possible that at least one of them, the *Endoceratida*, had an independent center of development in the Australian region.

Drs. Curt Teichert and B. F. Glenister of the University of Melbourne, who have studied mollusks of the Ordovician period, find that they show surprisingly close affinity with those of eastern North America of the same period.

In the twilight of ancient geological time, early Cambrian, trilobites, peculiar marine animals now extinct, swarmed in Australian seas and many of these were immigrants from the Baltic and from China. Later, in Devonian times, the faunas of Australia and New Zealand were almost entirely of European derivation, Dr. Edmund D. Gill of the National Museum, Melbourne, told the scientists.

Later, during the Lower Carboniferous or Mississippian period, fossils again have strong affinities with North American and European species.

From the study of foraminifera, minute marine organisms, of the more recent Tertiary deposits, H. de B. Hornibrook and Heather Leed of the New Zealand Geological Survey conclude that New Zealand and South America were at the time populated from a common source in the southern ocean.

Evidence from fossil sea-urchins and starfishes of the same period indicates, H. Barraclough Fell of the Victoria University College, Wellington, N. Z., has found, that these shallow-water animals migrated southwards along the Indo-Malayan Archipelago.

A few genera in the recent New Zealand fauna, which are related to South America and not with Australia, are considered to be of New Zealand origin and to have reached South America through the agency of west-to-east circumpolar currents.

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ASTRONOMY

New Comet Heads Northwest Through Sky

➤ THERE IS another new comet in the sky, but it is far too faint to see.

Discovered in the constellation of Cepheus, now visible in the north, the comet is heading northwest. Of the 15th magnitude, it can be seen only through a powerful telescope.

The new comet was spotted on Aug. 18 by Robert Harrington of the California Institute of Technology, Pasadena, and the Mt. Wilson and Palomar Observatories, as part of the sky survey being conducted by Palomar Observatory and the National Geographic Society. Mr. Harrington discovered another faint comet last October, and within the past 13 months has co-discovered two more.

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ENGINEERING

Radio Static Not Linked To Electric Power Lines

➤ THE POPS and crackles that mar radio reception are not caused by wind, dust and smoke blowing across high-tension electric power lines, George S. Smith and Andrew B. Jacobsen, both of the University of Washington, reported to the Pacific meeting of the American Institute of Electrical Engineers in Phoenix.

Wind tunnel tests at the University and field tests near Burke, Wash., produced little evidence that wind-carried dust or smoke particles created radio static, "at least within the range of wind velocities and voltages applied," they said.

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CHEMISTRY

More Pleasant Pepper Taste Made Chemically

➤ A PEPPERY bite taste more pleasant than that of the natural black pepper taste substance has been achieved in chemical manipulations by Drs. Torsten Hasselstrom, Harold W. Coles and Norene E. Kennedy at the U. S. Quartermaster Corps' Pioneering Research Laboratories in Philadelphia.

They did this by substituting chemicals called pipecolines and methyl pyrrolidones for the piperidine that gives taste to pepper's piperine.

A taste-testing panel of eight members evaluated the seven new chemicals produced, Dr. Hasselstrom and associates report in *Science* (Aug. 22).

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MAKING SLAG HOLDERS—One of the steps in making the containers that hold the fiery tons of molten slag dumped from open hearth and blast furnaces is shown here. Workmen of the Mackintosh-Hemphill Co. are making sure the silica facing sand covers all pattern surfaces, inside and outside.

ENTOMOLOGY

Spruce Beetle Menace

Engelmann spruce stands, valued at $50,000,000, are threatened by unexpected and sudden upsurge of beetles as result of 1949 tree-uprooting windstorm.

➤ A SENSATIONAL uprising of the Engelmann spruce bettle has resulted in one of the most damaging insect outbreaks ever to occur in forests of the northern Rocky Mountains, Department of Agriculture officials report.

Engelmann spruce stands, valued at $50,000,000, are threatened by the sudden and widespread beetle epidemic. In some areas, 90% of the trees have already been infested and killed by the bean-sized insect. Spruce is a good, all-around softwood, about fifty million board feet being cut each year.

The amazing quantity of insects breaking out now results from beetles bred in a tremendous number of spruce trees uprooted in a violent winstorm that swept the northern Rocky Mountain area in November, 1949.

Large-scale efforts are being made to salvage the beetle-killed spruce. Lumber companies are pushing their logging and sales efforts toward the salvage and marketing of the extraordinary large volume of spruce. Dead spruce trees can be used for lumber for three or four years after being killed.

The epidemic centers in the Kootenai National Forest in northwestern Montana, the entomologists report. Although an increase in spruce beetle infestation had been predicted following the 1949 blow, the suddenness with which it appeared and the widespread nature of the rampage within the last two months, far exceeded the forecasts.

Federal, state and private foresters are now surveying forest stands to find out exactly how serious the outbreak is. Not new to the western forest country, the beetle has been successfully fought in Colorado by hand-spraying infected trees with an orthodichlorobenzene-fuel oil mixture, called "goop" by the entomologists.

Montana insects, it is feared, may not respond to the same treatment, since spruce trees there have thicker bark and the beetles are therefore more difficult to reach with the mixture. Montana's spruce trees also grow taller, thus possibly many of the beetles may be up beyond the reach of present equipment.

Both time and research into the insects' habits are needed to figure out a program adequate to control the spruce bettle in Montana, the entomologists state.

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MEDICINE

Soaking in Hot Bath Still Good Medicine

➤ SOAKING IN warm or hot baths, advised by physicians centuries ago, is still good medicine in the opinion of Drs. Igho H. Kornblueh and George M. Piersol of the University of Pennsylvania Medical School, Philadelphia.

At the American Congress of Physical Medicine meeting in New York, they urged development of the nation's mineral springs into health spas of the European type.

Spas, they said, provide ideal settings for psychosomatic treatment, and patients enjoy the hotel instead of hospital atmosphere.

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ENTOMOLOGY

Insect Who's Who Gives Help for Farm or City

➤ A VERITABLE Who's Who of insects has now been published. Whether you are a city housewife worrying about a new, strange bug on the kitchen floor or a farmer wondering how to protect the apple crop or a little girl trying to collect and feed grasshoppers, you will get help from this book.

It has color portraits as well as biographical sketches of more than 50 important insects. It has black and white pictures of many, many others. It tells what insects attack, what they like to eat, what to do about them. Most farmers will want it alongside their plow, but all of us could read it with profit because, as entomologists say, the insects will get us all if we don't watch out.

This valuable and beautiful new book on insects is the U. S. Department of Agriculture's Yearbook for 1952. You can get your copy from the Government Printing Office, Washington 25, D. C., for $2.50, or order it through SCIENCE SERVICE. (See SNL, Aug. 30, p. 140.)

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BIOCHEMISTRY

Blood Stain Traced By Serum Identification

➤ IF YOU want to know whether the blood in a blood stain came from a dog, deer, man or beefsteak, the Wisconsin Alumni Research Foundation in Madison can supply the specific immune serum for identification. The Foundation laboratories are also making identification tests employing the serum.

Material is now available for tests for horse, beef, human, sheep, pork, dog, cat and deer serum and the stock will be expanded as others are prepared on request.

The material is now shipped with dry ice but it is hoped that eventually it can be freeze-dried and sent throughout the world without difficulty.

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RADIO ASTRONOMY

Radio Star's Noise Is Blocked by Sun

➤ ASTRONOMERS FOR the first time have actually recorded the dimming of the hisses of a noisy radio star as the sun passed between the star and the earth.

The volume of the star's static begins to decrease long before the sun actually passes in front of it, K. E. Machin and F. G. Smith of the Cavendish Laboratory, Cambridge University, report in *Nature* (Aug. 23).

The first reported "radio occultation," as it will probably be called, was of the radio star in the constellation of Taurus, the bull. This noisy star is believed to be the Crab nebula, the expanding remnants of a star which exploded almost a thousand years ago.

During June, the apparent intensity of microwave radiation from the noisy object was measured at noon on 17 days when the sun's southern limb passed close to it. Measurements of frequencies of 81.5 and 38 megacycles showed that the hisses became less loud as soon as the sun approached the radio star to within even ten times the sun's apparent radius. Refraction in the solar corona is responsible for this dimming of the star's hisses, the Cavendish astronomers believe.

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AERONAUTICS

Sprite Cold-Rocket Has Low Working Heat

➤ AMONG NEW developments in aviation to be shown in September at the British Flying Display and Exhibition, Farnborough, Eng., is the Sprite cold-rocket, a supplementary powerplant to assist airplanes at take-off.

It gets the name from its low working temperature, around 500 degrees Centigrade, in comparison with 2,000-degree temperatures of ordinary rockets.

The cold-rocket uses liquid fuels to make its own oxygen, its 5,000-pound thrust being derived from sodium or hydrogen peroxide. It is called the de Havilland Sprite rocket, and two of them will be used in the demonstration to assist a de Havilland jet-powered Comet into the air.

At the same exhibition, Britain's most powerful jet engine, the Bristol Olympus, will be flown for the first time in a twin-engine Canberra flying test bed. The two engines to be used give a combination of nearly 20,000 pounds thrust. They are not intended for permanent use in the Canberra, since this jet plane is not designed for such powerful thrusts.

A new faster-than-sound plane will also make its first public appearance at the flying exhibition. It is the de Havilland 110, a two-seat all-weather craft that has made several supersonic test flights. It is powered by two Rolls-Royce Avon axial flow turbojets.

British pilots will show at the display the spectacular effects of flying jet planes with re-heat, similar to what is known in the United States as the after-burner. Fuel is sprayed into the tail pipe of the jet engine and burned there. Some 50% extra power can be provided for short periods by this re-heat, now standard on all the latest models of British jet aircraft.

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ENTOMOLOGY

Beetles Hitch-Hike Rides on Passing Bees

➤ BEETLES THAT hitch-hike rides on passing bees are reported by entomologists at the University of California's College of Agriculture.

The beetles are parasitic on wild bees, but lay their eggs on flower buds. As the buds develop into flowers, the beetle eggs hatch. The beetle larvæ then crawl up on the flower blooms and wait for a wild bee to come along hunting for nectar and pollen.

When the bee lands on the flower, a beetle larva hooks on to a hair on the bee's body. Then the bee, with the beetle firmly attached, flies back to her nest. Inside the egg cell, the beetle crawls off the bee and settles down in the cell. After the bee lays her egg and provides a generous pollen-ball for her developing offspring, she seals the cell. The beetle proceeds to eat the bee's egg and then start in on the pollen-ball.

When the beetle has eaten its fill, it changes into an adult, burrows out of the cell and flies to flowers. There it feeds on nectar, mates and lays more eggs on flower buds. Thus the cycle starts over again.

These hitch-hiking beetles are highly specialized for their way of life. As young larvæ, they use their strong jaws to grab onto the bee. They are the only known beetles, when adult, with mouthparts similar to those of butterflies. All other beetles chew their food, but these beetles, as adults, can eat only nectar from flowers.

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ASTRONOMY

New Exploding Star Spotted From Mexico

➤ A "NEW STAR" has been spotted in the southern sky. Still too faint to be seen without a telescope, this 11th magnitude nova is in the constellation of Orphiuchus, the serpent holder, visible in the south after sunset.

The exploding star is not far from the region where Nova Orphiuchi, also known as Kepler's star, blazed forth in 1604. This star, one of the most famous novae in history, became brighter than Jupiter, then faded from naked-eye vision in a little more than a year.

The nova was discovered by Sr. Braulio Iriarte of the National Astrophysical Observatory, Tonanzintla, Puebla, Mexico, on Aug. 22.

Science News Letter, September 6, 1952

IN SCIENCE

METEOROLOGY

Hurricane Flyers May Be Replaced

➤ THE NAVY pilots keeping track of hurricanes in the Atlantic will one day be out of a job.

The difficult and dangerous job of flying into the center of a hurricane to get information about its strength, the direction in which it is traveling and its speed will be taken over by two instruments designed originally for other purposes. One is the seismograph, used in earthquake recording; the other is radar, used to track airplanes and other moving objects.

It is known that hurricanes develop microseisms, very tiny earthquakes. Recent Navy research with typhoons off Guam has shown that hurricanes can be tracked from hundreds of miles away through the recordings of these microseisms on seismographs. However, many details need to be worked out before hurricanes can be tracked accurately by this method.

For close-in work, radar can do the job quite well. Already a network of radar stations over the southeast is prepared to supplement the Navy and Air Force pilots who fly out to the hurricanes and their winds of more than 100 miles per hour.

Science News Letter, September 6, 1952

AGRICULTURE

Egypt Could Become Europe's "Fruit Basket"

➤ EGYPT COULD become the "fruit basket" of Europe, Dr. Robert W. Hodgson, dean of the College of Agriculture of the University of Californja at Los Angeles, has found during a seven months' study of Egypt's fruit industry under a Fulbright research grant.

Egypt's easy access to the Suez Canal and her low labor costs offer excellent opportunities for export of citrus fruits and dates to Europe.

The popular mango fruit, for example, grown only in tropical countries, is being shipped to Europe all the way from South Africa and India. Egypt's growing mango industry is thousands of miles closer to principal European markets.

Prof. Hodgson estimated that Egypt has about 150,000 acres devoted to fruit production. This includes dates, citrus fruits, grapes, mangos, bananas, guavas, figs, olives and such stone fruits as apricots.

He also reported that Egyptian graduates of American agricultural colleges are rapidly moving into positions of influence in the government's Ministry of Agriculture.

Science News Letter, September 6, 1952

E FIELDS

PSYCHOLOGY

Darkness Not Needed To Test Night Vision

➤ TO TEST the night vision of Army recruits, it is no longer necessary to let them sit for 30 minutes adapting their eyes to the faint illumination and then make the test in darkness.

A group of scientists from the Army's Personnel Research Section told the American Psychological Association meeting in Washington that tests can be made after 10 minutes of adaptation. Standard charts and vision-testing equipment can be adapted for use in a half-light illumination equivalent to moonlight obscured by clouds.

These mesopic vision tests are much more practical to give than night vision tests, and scores on them have such a close relation to night vision scores that the mesopic vision tests can be substituted, Drs. Joseph Zeidner, Julius E. Uhlaner and Donald A. Gordon reported.

After about a 10-minute adaptation period, testing is started at the lowest brightness level. Only 15 to 30 seconds is allowed for adaptation to each new brightness level.

One of the instruments used for mesopic vision testing is a modified Ortho-Rater. The person tested sits in a small booth, but the target he looks at appears to be at a distance of 26 feet. This saving of space is also a great convenience in tests conducted by the armed services.

In this dim light between daylight and darkness, either rod (night) or cone (daylight) vision may be in use. Different individuals vary in the extent to which they use either rods or cones.

Science News Letter, September 6, 1952

GENETICS

Breed Heat-Resistant Steers for Deserts

➤ FINDING A beef animal that can be bred in the 120-degree summer heat and below sea-level elevation of California's Imperial Valley is the goal of research workers of the University of California.

Ten calves from Braford (Brahma-Hereford) crosses bred to a Charolais bull are being tested at the University's Imperial Valley Field Station, El Centro.

The fast-growing Charolais, a dual-purpose beef and milk breed in its native France, is being tried in combination with the British breeds to see how the animals will do in the intense Imperial Valley heat.

Imperial Valley ranchers, with the advantage of high-production irrigated pastures and grain fields, now feed around 120,000 head of cattle annually, but most of the stock is purchased outside and fed in the Valley before marketing.

"We want to see if it is economically feasible to keep a cow the year around on the high-priced land in the Valley, or if it is better economics to continue buying feeders," said N. R. Ittner, station superintendent.

Other breeding experiments will be conducted with a variety of crosses with the heat-resisting Brahma cattle from India, Brangus (Brahma-Aberdeen Angus) and Brahorn (Brahma-Shorthorn) as well as with Brafords.

Science News Letter, September 6, 1952

ENTOMOLOGY

Prolong DDT Power By Phosphate Spray

➤ THE INSECT-KILLING power of DDT when sprayed on walls may be prolonged by first spraying the walls with a normal solution of phosphate.

This discovery was made by Dr. H. Maes of Elisabethville in the Belgian Congo. He was trying to find why DDT lost its power rapidly when sprayed on the walls of certain African houses. Its usual long-lasting action when sprayed on walls is one of its great virtues in anti-mosquito campaigns.

If the walls of the houses are made of soils that contain iron in the ferric form or aluminum, DDT is quickly changed chemically and loses its insect-killing power, it has been found. The chemical change is a process of dehydrochlorination.

Phosphate, which neutralizes the ferric ions, stops this. Dr. Maes reports his findings in *Nature* (Aug. 23).

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MARINE BIOLOGY

Clam's "Beard" Woven Into "Sea Wool" Apparel

➤ GARMENTS WOVEN of so-called "sea wool," which is possibly the golden fleece of Jason, would be quite costly, but they could possibly be obtained today in Italy.

A "sea wool" glove of modern manufacture is among one of the exhibits of the Smithsonian Institution.

How the "beards" of the giant Mediterranean clams, *Pinna marina,* were woven into garments is described in a publication on Islamic art issued jointly by the University of Michigan and the Freer Gallery of Art of the Institution.

The giant clam's shell has been known to be as long as three feet, although the average is less than half of this. From a gland in its "foot," the clam secretes silklike strands with which it attaches itself to the sea bottom. These strands may reach a maximum length of about a foot.

The silklike strands are of exceptionally fine quality, or were so regarded by the Arabs. This "silk" was once used to weave cloth for highly-prized garments.

Science News Letter, September 6, 1952

MEDICINE

Polio Cripples Get Jobs More Easily

➤ INFANTILE PARALYSIS cripples are more likely to get jobs than other handicapped persons, Dr. Robert C. Darling of the Institute for the Crippled and Disabled, New York, reported at the American Congress of Physical Medicine meeting in New York.

His report was based on a survey made by himself and Marion S. Lesser of Columbia University College of Physicians and Surgeons of 267 patients discharged from the Institute in 1940-1941. The survey showed 82% of polio patients now gainfully employed, compared to 74% of bone, joint and muscle disease victims, 71% of amputees and 61% of cerebral palsy patients.

In getting a job, the following factors help to make up for disability: onset of a disability before 30 years but after birth; ability to achieve physical independence; average or above average intelligence, and at least some high school education.

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MEDICINE

Malaria Relapses Stopped by New Drug

➤ MOST OF our troops returning now from Korea will escape malaria relapses, thanks to the primaquine pill they take every day for 14 days during their return voyage. This is in contrast to experience last summer when large numbers of Korean veterans suffered malaria relapses.

Figures reported in the *Journal of the American Medical Association* (Aug. 23) show that the Korean malaria relapse rate has been reduced from almost 30% to less than one percent.

Unlike their elder brothers of World War II Pacific fighting, our troops in Korea now can escape entirely being sick with malaria. This is because the chloroquine they get during the malaria season suppresses the acute attacks and primaquine, given as soon as the chloroquine is stopped when the men start rotation home, prevents relapses.

Only ones now who may have relapses are those who miss getting the full 14 days of primaquine. This may be because they are flown home or because for some other reason, such as seasickness, they miss a noon meal when the primaquine pills are given.

Primaquine was synthesized at Columbia University during World War II. Extensive studies with animals and human volunteers followed. Four studies of the use of primaquine and chloroquine in controlling malaria are reported by civilian, Army and U. S. Public Health Service physicians.

"Moderate quantities" of the drug will shortly be available, although it has until now been limited because of short supplies to military installations and groups officially studying it.

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ELECTRONICS

Confuse Attacking Planes

Radio broadcasting stations operating normally provide enemy bombers with a "radio highway" to their targets. But Conelrad, developed by the FCC, fixes that.

By ALLEN LONG

See Front Cover

➤ SLEEK ENEMY planes zooming through the night toward America could speed straight to their bomb target as soon as they came within radio earshot of a commercial broadcasting station.

But the Federal Communications Commission, cooperating with the U. S. Air Force, fixed that. The Commission reached into its hat and pulled out Conelrad, a system of scrambling radio waves.

Meaning "control of electromagnetic radiation," Conelrad fouls the enemy's radio direction-finding equipment by putting all regular AM broadcasting stations on one of two defense frequencies. FM and TV stations are ordered off the air. Broadcasting stations used by police and firemen are supervised closely during the emergency and operate in a restricted manner.

What all that means to the listener is this: When an air attack seems to be coming, the radio program you are hearing will go off the air. The station will change its spot on your dial to either 640 or 1240 kilocycles.

If you retune your set, you can hear the Civil Defense messages being broadcast. Maybe you will hear a special program instead of Civil Defense messages.

Continuous Broadcast Heard

But all the while you are listening, the stations broadcasting that program will be going on and off the air. You will not notice it, though, because the stations will be ordered on and off the air on such a split-second schedule that one station takes up immediately when the other leaves off.

The stations will be given instructions from central dispatching points sprinkled throughout the country. Each central point will control a large "cluster" of stations. The clusters are further broken down into smaller clusters, the whole idea being to confuse the enemy thoroughly.

Ordinarily, the enemy would tune his direction-finding equipment to an AM broadcasting station in the target town. A compass-like needle would show him in which direction to fly to reach the city.

After getting there, the navigator might even be able to use the radio station to help him find his specific target. It might be a railroad yard, a dock or a war plant.

When radio direction-finding equipment is tuned to a commercial station, the antenna is told electrically to point to the direction from which the radio signals are coming. The antenna rotates until it is pointing to the station, and the compass-like needle turns likewise.

But under the Conelrad system, no radio broadcast stations would be on the air except those on the Civil Defense frequencies of 640 and 1240 kilocycles. The navigator thus would have to tune to one of those frequencies. He no longer would be able to single out a certain station in New York, Washington or Pittsburgh.

Confused Compass Needle

The navigator could tune his set to either of those frequencies, but the compass would tell him nothing. For as each station came on, the compass needle would swing to a different setting. Since the stations probably will broadcast for just a few seconds at a time, the compass needle will be kept in a high state of confusion.

To make it even more difficult for the enemy navigator to use his radio direction-finding equipment as a navigational aid, the stations will be ordered on and off the air in a random pattern. Thus, stations in Philadelphia might broadcast in one order, but on the next go-round they would be in a completely different order.

And to make it even tougher on the enemy, the setup is fixed so that some stations might be on 1240 kilocycles one night and on 640 kilocycles the next. The enemy never could be sure just where to find the desired station on his dial.

Sequential Broadcasting

Even if the enemy navigator knew exactly—to the second—when the station would be on the air and on what frequency it would be broadcasting, he could not use his radio direction-finding equipment with success. Interference from other clusters makes radio reception a jumble of noise about 30 miles away from cities.

Chances of the navigator's finding out when and where the desired station would be on the air are small, the FCC believes. High-level espionage would be required to give him that information.

After the FCC worked out the system of sequential broadcasting, as it is called, it was decided the enemy still might be able to use the radio stations as beacons if broadcasting power were not changed.

For instance, if the enemy knew New York had the strongest station in the area, he might be able to figure out that New York was broadcasting when he picked up exceptionally strong signals for a few seconds.

CONTROLLED RADIO BROADCASTS—Radio direction-finding equipment is rendered of no use to enemy aircraft searching for their targets by the new Federal Communications Commission's system. Here an Air Force corporal is shown watching hypothetical enemy planes approach while swift interceptors zoom to the scene.

The FCC solved that problem by scrambling station powers as well as frequencies. Now the enemy will not know where the strong stations are.

All told, the system will cost commercial broadcasters about $1,500,000. The money will go for new electronic gear needed to change the station's spot on your dial during an emergency. More money will be poured into the communication system that will link the stations to central dispatching points throughout the country.

Of the 2,500 AM radio stations in the United States, over half already have endorsed the plan. The FCC hopes to enlist at least three-fourths of them by the time Conelrad is completely set up. Stations that do not agree to take part, of course, will leave the air during an emergency.

The Air Force asked the FCC to work out Conelrad after military leaders realized radio stations would be a weak link in America's defense preparations. Since the stations would be needed to carry vital civil defense information, they could not be taken off the air. The FCC's plan has been approved by the Air Force and tested under simulated conditions of national emergency.

In the early hours of the morning, Air Force bombers have set out to "blast" certain targets, using their radio direction-finding equipment to guide pilots to the goals. Radio stations in the target areas switched to the Conelrad frequencies and went on and off the air as instructed. Progress of the planes was plotted continuously. How an interception unit operates is shown on the cover of this week's SCIENCE NEWS LETTER.

During the tests, the Air Force checked the effectiveness of the system on its own dead-reckoning navigational aids. Both the bearing types (that use the compass-like indicator) and the homing type (that directs the pilot to fly right or left) were tested.

In typical non-committal language, the tests were proclaimed "satisfactory." But there was a thoroughly satisfied inflection in the voices of those reporting.

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HOME ECONOMICS

Freezers Not For Clothes

➤ THE IDEA that nylon hose last longer if frozen before wearing is debunked in a report from the U. S. Department of Agriculture in Washington.

Freezers are for food, not nylons and not winter clothes, Agriculture's home economists state.

Their reasons are:

1. Tests by nylon manufacturers showed that freezing does not make this fiber more durable.

2. It is poor economy to take up freezer space with clothes during the season for fruits and vegetables.

3. Fur experts advise against storing fur garments in home freezers. Fur that is stored for any length of time folded or rolled will come out creased or crushed, and then will need glazing or other treatment to lift and straighten fur fibers. If the pelt freezes stiff, it is likely to crack at folds, especially if any weight, like packaged frozen food, is placed on or against it. Finally, there is the risk of damage from dampness, either in the freezer or later when the fur is thawing out. Dampness may cause aging, fading, loss of lustre or even mildewing. Fur garments in commercial cold storage hang loosely so that air can circulate around them. Both temperature and humidity are carefully regulated to keep fur in best condition. Any fur worth home freezer space would seem to deserve expert commercial storage.

4. Clothes can be protected from moths without freezing or even refrigerating them, and the freezing treatment gives no protection when the clothes come out of the freezer.

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PSYCHOLOGY

Boys Fitting Into Army Take Authoritarian Ideas

➤ SIX WEEKS in the Army may make a boy shift toward acceptance of authoritarian ideology. So Dr. Richard Christie of the Research Center for Human Relations, New York University, told the American Psychological Association meeting in Washington.

The boy's political views before he went into service have nothing to do with this shift. What is important is how well he fits into military life and what his buddies and superior officers think of him. If he fits in well and makes a good soldier, then he tends to accept the authoritarian way of thinking.

Dr. Christie's conclusions are based on interviews with 182 inductees in an Army basic training center.

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SEISMOLOGY

Earth Has Hard, Dense, Solid Metallic Heart

➤ THE EARTH has a hard, solid heart.

Prof. K. E. Bullen, Sydney University mathematician, told the Australian and New Zealand Association for the Advancement of Science meeting in Sydney that his researches show that the earth's inner core, with a radius of about 800 miles, is solid with a density at the center about 18 times that of water. It is chemically distinct and consists of iron, nickel and probably some denser metals.

The rest of the central core, extending to 2,200 miles from the center, consists of a liquid form of silicate rock about 11 times the density of water, Prof. Bullen's work on earthquake vibrations has indicated.

Prof. Bullen has for some years been studying the density variations through the earth's interior by means of observations of earthquake waves. Earthquake vibrations travel right through the earth and vary in speed according to the density and elastic properties of the material encountered. By studying their times of arrival at different seismological observatories throughout the world, various properties of the earth's interior can be estimated.

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PSYCHOLOGY

Worm Learns to Turn

Worms can be taught to take right direction through a maze, but appear to tire of going through it. Paramecium also can be trained, scientist finds.

➤ WORMS CAN be taught to turn, John S. Robinson of Cornell University told the American Psychological Association meeting in Washington.

He taught five earthworms to go through a T-shaped maze. At first the worm was allowed to follow its own preference, but the favorite direction of turning was noted. Then the worm was required to turn in the opposite direction. If it turned into the preferred arm, it received a mild electric shock, but if it went into the opposite arm of the T, it was rewarded by reaching a nice box of moist earth.

After about 150 times through the maze, the worm learned to turn in the right direction more frequently, but after only 50 trips the worm slowed down, apparently not liking the maze at all.

Even the tiny one-celled creature that lives in a drop of stagnant water can be trained, and its capacity for learning is related to its heredity, the Association learned.

Mrs. Beatrice Gelber of Indiana University, Bloomington, told the meeting how she taught the *Paramecium aurelia* to go to a platinum wire to get food.

She started with two mated pairs of these little animals that are so tiny they can be seen only under a microscope. These four individuals were trained and their success in finding the food-laden wire was measured. Then they were permitted to go through 20 cell divisions until they reached the stage of self-fertilization and produced the next generation. Again four individuals, one for each hereditary line, were trained. And so on, through six generations. Offspring of one mating type showed a change in teachability over the six generations, but those from the other did not.

A salt water fish, the mullet, was taught to associate the punishment of a mild electric shock with either a light or with sounds of certain frequencies, but it became very worried in the process, Dr. W. N. Kellogg of Florida State University, Tallahassee, reported to the same meeting.

All the 24 fish trained by Dr. Kellogg developed a conditioned reflex within 70 trials. But, during the training, they developed a powerful anxiety state, as shown by the rate of their respiration, gill and mouth movements. The respiration dropped back to normal after they were no longer shocked.

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PSYCHOLOGY

Balloon in Stomach Relieves Hunger Pangs

➤ AN AIR-FILLED balloon in the stomach can fool even a ravenous rat into thinking it is not hungry, although it has not had a morsel of food in its mouth.

This was shown by experiments conducted by Dr. Neal E. Miller and Mrs. Marion L. Kessen of Yale University, New Haven, Conn., and reported to the American Psychological Association meeting.

Hungry rats were trained to press a bar to get a drop of enriched milk. Later, a balloon, previously placed in the rat's stomach, was inflated with 14 cubic centimeters of air. The animal's rate of work in pressing the bar fell off. But it fell off even more when 14 cc. of milk was injected directly into the stomach.

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PSYCHOLOGY

Clerical Job Not for Professor's Daughter

➤ HIRING A clerk?

If so, beware of: the girl whose father is a professor; the girl who took a college preparatory course in high school; the girl who thinks the type of work she is doing is important; the girl who has a good vocabulary and tosses off arithmetic problems.

Such applicants may look good when you pick them but within three months they will leave to go to college or to take a "more important" job. Dr. Philip H. Kriedt and Miss Marguerite S. Gadel of the Prudential Insurance Company, Newark, N. J., gave this warning to the American Psychological Association as a result of a study they made of clerical turnover.

It is better to hire for clerical work girls whose family and personal background have given them ambitions and interests that can be satisfied by the job you are offering, they told the meeting.

Do not be worried if she has a limited vocabulary and is no shining light in arithmetic reasoning. But pick the girl who has a high score on a clerical speed test and so displays an aptitude that can be used on the job.

Then you may get a girl who will stick to the job and be happy in it.

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PSYCHOLOGY

Seeing Influences Judgment of Feeling

➤ THE SIZE of an object you are looking at can influence your judgment of the size of another you are feeling in your hand. This interference of perception between two different senses, vision and touch, was reported to the American Psychological Association meeting in Washington.

Dr. Robert Jaffe of New York University College of Medicine asked 20 persons to run one hand along an aluminum strip and, without looking, to find an equal width on a scale held in the other hand.

After one minute of feeling the aluminum strip, they were asked to make another judgment of the width. In the meantime, 10 of the persons had been allowed to look at a strip of paper shown on a dark screen. The other 10 remained blindfolded.

When the paper strip was one-inch wide, the aluminum strip, actually two-inches wide, was judged to be wider than that. When the paper strip was four-inches wide, judgment of the width of the aluminum strip erred in the other direction: the strip seemed narrower than it actually was. Blindfolded individuals made the same size judgment after the one-minute time interval as before.

Psychologists, who have in the past explained visual or touch after-effects as due to changes in limited areas of the brain, such as the visual cortex or the touch cortex, will now have to develop a new theory, Dr. Jaffe told the meeting.

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PSYCHOLOGY

Dreams Are Different for Dictator Personalities

➤ STALIN PROBABLY has different experiences in his dreams than do more democratic rulers.

The way in which the dreams of people with authoritarian attitudes differ from those of more democratic individuals was described to the American Psychological Association meeting in Washington by

Dr. Samuel J. Meer of Western Reserve University, Cleveland.

The authoritarian individual, Dr. Meer explained, thinks in terms of blacks and whites with no middle ground. He cannot stand mixed emotions toward his parents. Like Hitler, he believes that "those who are not with me are against me." Aggression in dreams is mostly directed toward strangers and other peoples, not to family, friends, and acquaintances. Friendliness is only for the individual's own set.

The dictator personality is likely to over-idealize the virtues of his own group and over-emphasize the wickedness of all others.

Persons with a democratic viewpoint do not make such a distinction between "our gang" and outsiders. Aggression and friendliness in dreams is handed out impartially to both.

Dr. Meer based his conclusions on a study of the dreams of a group of college students who had been rated on their authoritarian attitudes.

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ENGINEERING

Rubberized Material May Stretch Road Life

➤ RUBBERIZED ROAD materials being developed at the University of Kentucky, Lexington, Ky., may be the engineers' answer to stretching the life of heavily traveled highways that become quickly worn under the normal load of cars, trucks and buses.

Research engineers believe that adding rubber to the ordinary bituminous road-surfacing material should make the pavement more rugged. The scientists are testing their theory in the University's highway laboratory where a "fatigue" machine treats samples of rubberized road-surfacing materials just as trailer trucks would.

Other machines and tests "age" the samples and subject them to the simulated heat of a blazing summer sun and of frigid winter temperatures.

Administered by the Kentucky Research Foundation under a grant from the Firestone Tire & Rubber Company, the project currently is being carried on by the University's Engineering Experiment Station.

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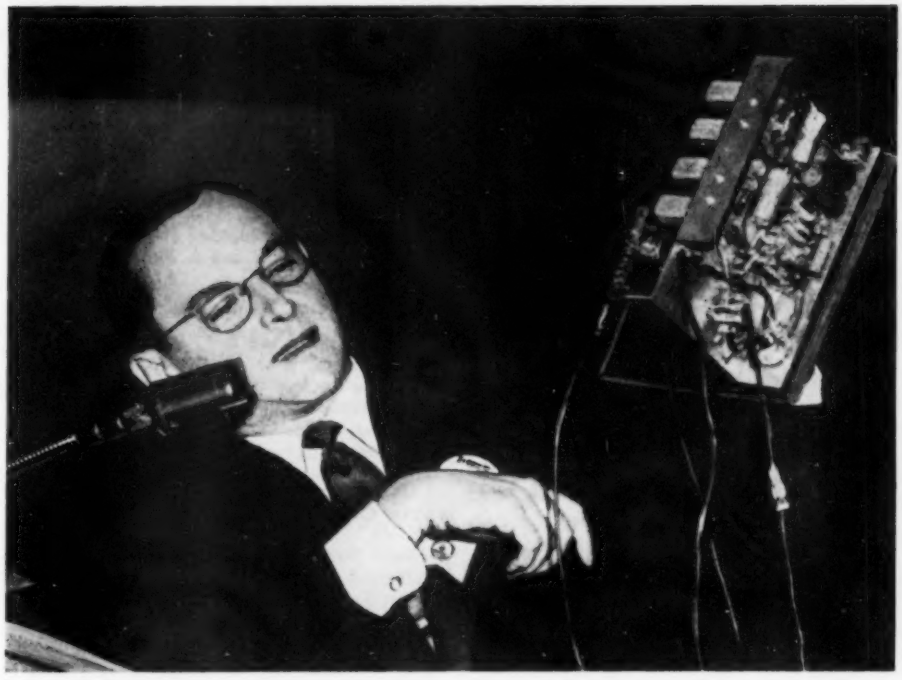

TRANSISTOR RECEIVER—Experimental model of a transistor receiver is demonstrated by Dorman D. Israel, executive vice-president of Emerson Radio and Phonograph Corporation, who predicts that in less than three years mass production of "shirt-pocket" radios will make this prototype a "grand-daddy." Transistors, made with a tiny disk of germanium, can replace vacuum tubes for many purposes.

MARINE BIOLOGY

Claim Long Proboscis an Elephant Seal Advantage

➤ IT IS an advantage to an elephant seal to be a Jimmy Durante of the species, because a long proboscis gives a better station in seal society.

Elephant seals, once almost extinct, are being sighted in increasing numbers on certain islands off the coast of southern and Baja California.

The place of the male elephant seal in his society is determined by his ability to dominate other males. This is particularly true during the breeding season. His position is often won and maintained largely by the amount of noise he can make. Thus his "bark," actually more of a loud snort, is often as important as his bite.

The amount of noise a seal can make depends upon the length of his snout, Dr. George A. Bartholomew, assistant professor of zoology at the University of California at Los Angeles, has found. The longer the snout, which is often a foot or more, the louder the snort. Apparently the elongated proboscis has no other use.

The elephant seal also snores to amuse himself, Dr. Bartholomew has found. While partly submerged in an isolated tide pool, he may snore in a manner that suggests singing in a bathtub. He apparently enjoys the resonant effect of his "natural bathtub" just as a human being does that of his tub or shower.

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TECHNOLOGY

Mud-Jacking Raises 300 Floors in Housing Area

➤ HOME OWNERS who have become dismayed because the floors in their houses have sunk may find new hope in a quick, easy and relatively inexpensive method of raising the concrete slab back to where it should be.

Called mud-jacking, the method was used in Pearl Harbor, T. H., by the District Public Works Office when about 300 concrete floors sunk in Naval Base Housing Areas. Some of them settled as much as seven inches.

A slurry of mud and water was mixed and pumped through holes drilled in the concrete slabs. Under a pressure of 100 pounds per square inch, the mud gushed from the hose nozzle and restored the slabs to their proper position.

Improvements in the process were made as more floors were raised. The last 33 floors restored in March cost an average of only $42.66 each. If the slabs had been broken, removed and replaced, the cost would have been about $325 each.

Although mud-jacking is not new, it has not found widespread use in raising concrete flooring slabs of houses. The method has previously been used primarily to jack up concrete approaches to bridges to eliminate bumps.

But before the process can be used on houses, the sunken slab must be made "free floating." That is, it cannot have walls resting upon it.

In houses where the walls are put up first and the concrete slab poured last, the binding between walls and slab is broken and mud-jacking begins. If the bond cannot be cut, the slab may crack under the pressure of the mud.

The process may be used in other housing projects as more persons learn about the new application. Already some floors in the United States have been restored by mud-jacking.

Details of the Pearl Harbor mud-jacking project are reported in the *Civil Engineer Corps Bulletin* (Aug.).

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. books in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

BEET-SUGAR ECONOMICS—R. H. Cottrell, Ed., *Caxton*, 379 p., illus., $5.00. Beet sugar produced in the U. S. supplies about 25% of the domestic market and has to compete with cane sugar produced with cheap labor. Political aspects of this industry are also discussed.

THE CABINETMAKER'S TREASURY — F. E. Hoard and A. W. Marlow—*Macmillan*, 267 p., illus., $6.00. Step-by-step procedures for reproducing period furniture, including drawings of authentic antiques. For the skilled craftsman or amateur.

CAMBRIAN STRATIGRAPHY AND PALEONTOLOGY NEAR CABORCA, NORTHWESTERN SONORA, MEXICO—G. Arthur Cooper and others—*Smithsonian Institution*, Smithsonian Miscellaneous Collections, Vol. 119, No. 1, 183 p., illus., paper, $3.00. Cambrian rocks were not discovered in Mexico until 1941. The various groups of fossils now known are described.

THE CASE OF DORA AND OTHER PAPERS—Sigmund Freud—*Norton*, 243 p., $3.50. Some of these eight essays, written between 1905 and 1918, were previously published under the title "Freud on War, Sex and Neurosis." The title paper is the history and treatment of a case of hysteria.

THE CRYSTAL STRUCTURE OF SOLID CHLORINE —Robert L. Collin—*Mellon Institute*, 2 p., paper, free upon request to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa.

INTRODUCTION TO CONCEPTS AND THEORIES IN PHYSICAL SCIENCE—Gerald Holton—*Addison-Wesley*, 650 p., illus., $6.50. An introductory text designed for students who do not intend to major in chemistry or physics. Presents basic ideas and theories rather than a survey of the field.

MAN INTO WOLF: An Anthropological Interpretation of Sadism, Masochism, and Lycanthropy—Robert Eisler — *Philosophical Library*, 286 p., $6.00. Suggesting the possibility that crimes of violence, including murder and war, have their origin in man's evolutionary past.

MEETING OF MINDS: A Way to Peace through Mediation—Elmore Jackson—*McGraw-Hill*, 200 p., illus., $3.50. A study of the techniques and practices used in settlement of disputes of labor and between nations, their similarities and dissimilarities, for the purpose of discovering how experiences in one field may contribute to the other.

PHOTOGRAPHY ANNUAL: 1953 Edition—Bruce Downes, Ed.—*Ziff-Davis*, 282 p., illus., paper, $1.00. This year's edition of outstanding pictures, both American and foreign, contains a section on color photography and a number of picture stories. Notes in the back of the book tell how the pictures were taken and the equipment used.

PLAYTIME WITH PATTY AND WILBUR—Hugh C. McDonald—*Murray and Gee*, 31 p., illus., paper, $1.00. Written by a police official in the hope that these stories, read by parents to children, will help to protect the youngsters from sex criminals.

THE SCIENCE OF ZOOLOGY—James C. Perry—*Bruce*, 709 p., illus., $6.50. A text presenting zoology as a science in its own right and not as an introduction to specialized fields.

SPIKE: The Story of a Whitetail Deer—Robert M. McClung — *Morrow*, 64 p., illus., $2.00. A child's story in large print telling what happens to this deer from the time he tries out his unsteady legs to the end of his first year when the spikes that will be his antlers appear.

SURFACE COMPLEXES ON CARBON BLACKS. I. High Temperature Evacuation Studies — R. B. Anderson and P. H. Emmett—*Mellon Institute*, 3 p., paper, free upon request to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa.

TWELFTH SEMIANNUAL REPORT OF THE ATOMIC ENERGY COMMISSION — Gordon Dean, Chairman—*Govt. Printing Office*, 125 p., paper, 35 cents. A summary of major advances in atomic energy programs from January to June, 1952, including research in the medical, biological and physical sciences.

TV TROUBLESHOOTING AND REPAIR GUIDE BOOK — Robert G. Middleton — *Rider*, 204 p., illus., paper, $3.90. Practical guide with limited theoretical discussions and explanations. Included is a chapter on test equipment emphasizing the oscilloscope.

VIRUSES AS CAUSATIVE AGENTS IN CANCER—C. P. Rhoads, Ed., *New York Academy of Sciences*, Annals of the New York Academy of Sciences, Vol. 54, Article 6, 360 p., illus., paper, $4.00. Comprehensive collection of current studies on the microbic hypotheses as to the cause of cancer.

WINTER AND SPRING FLOWERS — Constance Spry — *Studio Publications* (Crowell), 140 p., illus., $5.50. A companion volume to the author's "Summer and Autumn Flowers," it deals mainly with floral arrangements. In a chapter on Christmas decorations, she has some suggestions other than the traditional.

Science News Letter, September 6, 1952

Do You Know?

Animal *life* in the sea exists even to depths of four miles.

Vanadium once was so rare that a pound of it brought $4,760.

Diesel *locomotives*, on the average, carry a ton of freight 500 miles on a gallon of fuel oil.

About 31 acres of ordinary woodland are required to give as much *grazing* for cattle as an acre of good pasture.

The puma and the housecat have similar tooth formations, but the American bobcat has two less *teeth* than the housecat.

Questions

BIOCHEMISTRY — How can blood stains be identified? p. 151.

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CHEMISTRY — What gives pepper its taste? p. 150.

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ENTOMOLOGY — How can the insect-killing power of DDT be prolonged? p. 153.

• • •

ELECTRONICS—How could attacking enemy planes be prevented from homing on radio stations? p. 154.

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HOME ECONOMICS—Is freezing your nylons to make them last longer recommended? p. 155.

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PSYCHOLOGY—How can worms be taught to turn? p. 156.
Is a professor's daughter a good bet for a clerical job? p. 156.

• • •

RADIO ASTRONOMY — How does the sun affect the noise of radio stars? p. 152.

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SEISMOLOGY—Of what is the earth's heart made? p. 155.

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Photographs: Cover and p. 154, U. S. Air Force; p. 147, Bell Telephone Laboratories; p. 149, Firestone Tire and Rubber Company; p. 151, Associated Photographers; p. 157, Emerson Radio and Phonograph Corporation.

VETERINARY MEDICINE

DDT Sprays Do Not Harm Beef Cattle

➤ CONTINUED SPRAYING of beef cattle with DDT insecticide apparently does not have any poisonous effect on the animals and does not interfere with weight gains. Studies showing this have been made by two Texas veterinarians, the American Veterinary Medical Association reported in Chicago.

Less than 90 parts per million of the DDT were absorbed by the cattle tested and these minute amounts were largely stored in the fat.

Science News Letter, September 6, 1952

PHYSICS

Cosmic Ray Mystery

Origin of cosmic rays and how they attain their near light-speed velocities are problems being attacked through use of high-flying balloons carrying photographic plates.

➤ ONE OF the deepest mysteries of the sky about us is the nature and origin of cosmic rays. What they are, where they come from and what they do is currently puzzling scientists.

Cosmic rays are particles that are accelerated in space to velocities near the speed of light. They include positrons, mesons, protons and the so-called "heavy nuclei."

Positrons are positively charged electrons. Mesons are particles with a mass greater than electrons but less than the positively charged nuclear proton. Heavy nuclei are atoms that have been stripped of their outer electrons.

The cosmic particles bombard the earth constantly at energies millions of times greater than scientists can obtain with modern accelerations. It is not known how these energies are reached.

Most of the cosmic rays that shoot in from outer space do not penetrate the earth's atmosphere to sea level. Called primary radiation, the rays frequently strike atoms of gases that make up the air. When they do, the atom usually is smashed and its particles race off in many directions. Those particles are detected on earth as secondary cosmic rays.

Scientists studying cosmic rays under a broad Navy program say it is a frustrating task. To study the primary rays, the "laboratory" should be about 23 miles above the earth where the original particles can be found.

Laboratory instruments and equipment, of course, can be carried to such heights by present-day rockets, but the rocket flight is a short-time proposition. Cosmic ray apparatus should be kept at the high altitudes for hours.

Balloons currently are being used by the Navy scientists to carry instruments high into the air and to hold them there while the mysterious particles shoot into the equipment and leave tell-tale tracks on photographic plates. Other equipment radios information to the ground as soon as a cosmic ray is detected.

So tiny are the photographic traces of cosmic rays, they must be found under a microscope. Two dozen plates of film, properly exposed, are sufficient to keep scientists busy for two or three years.

The Navy scientists say their research program is a basic one as contrasted to an applied research program. They explain that no definite goal is sought, such as harnessing cosmic rays.

Basic research always is needed and usually pays off. The scientists believe the bits of cosmic-ray knowledge gathered by researchers eventually will be tied together by science into another advancement for mankind.

Science News Letter, September 6, 1952

PHYSICS

New Device Measures Drag of Air on Ground

➤ A SHEAR meter, so sensitive that it can measure a drag force of only 1/100,000th of a pound per square foot, has been developed by John E. Vehrencamp of the University of California at Los Angeles.

It was designed for a study of the drag effect of air currents on the earth's surface and its influence on wind velocities and transfer of heat into the air. Such factors are related to problems in orchard heating and the laying of smoke screens.

Its data should be more accurate than those from earlier models.

The device consists of a round container in which the immediate terrain under study is duplicated. This container is suspended in a liquid silicone. Drag forces on the duplicated surface are measured by an electronic device underneath the container.

Science News Letter, September 6, 1952

New Machines and Gadgets

For addresses where you can get more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C., and ask for Gadget Bulletin 638. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

CHECK PROTECTOR punches tiny holes in personal checks to keep forgers from altering the payee's name, the amount of money, or the signature on the check. Made of plastic, the device measures 3¾ inches long and is 1 inch wide.

Science News Letter, September 6, 1952

PERSONAL DOSIMETER for the layman who some day may be exposed to damage-causing rays of an atomic bomb is small and light enough to fit into a vest pocket easily. A fluid inside the case changes color as the bearer becomes more severely irradiated, the color indicating the dose of irradiation received.

Science News Letter, September 6, 1952

WATCH BEARINGS made of a special metallic alloy instead of usual synthetic jewels reduce friction in the watch works. Design engineers say the new alloy bearings help the wrist watch to survive much of the slam-banging treatment Junior often deals his timepiece.

Science News Letter, September 6, 1952

OVERHEAD GARAGE door kit, shipped complete with all the hardware needed to assemble and install the door, shown in the photograph. It features redwood paneling and pine framing pre-cut

and pre-drilled to fit standard openings. Instructions tell how to reframe for odd-sized garage doors.

Science News Letter, September 6, 1952

DUAL TAPE recorder records on two tracks separately or at the same time. Each track can be handled just as a regular single-track tape recording, or both can be played back simultaneously to yield "third-dimensional" sound when properly recorded and reproduced.

Science News Letter, September 6, 1952

ACCESSORY BAG for women is slung over the shoulder and is roomy enough to accommodate several books, magazines and personal articles often carried on trips. Made of plastic, the bag comes in colors of green, blue, gray, palomino and red. It resists scuffing and rain.

Science News Letter, September 6, 1952

PROTECTIVE COATING for interior walls can be scrubbed time and again to remove dirty handspots or other smudges. Based on a vinyl resin, the colorful sprayed-on coating resists mildew, spattered fats, greases and inks. It dries to surfaces resembling leather grain.

Science News Letter, September 6, 1952

STROBOFLASH LAMP, easily attached to most types of cameras, provides a portable flash unit operated from two 225-volt dry batteries. The device can be fired every 3 or 4 seconds and about 2,000 flashes can be obtained from one set of batteries. The power pack can handle up to three lamps.

Science News Letter, September 6, 1952

Nature Ramblings

AUTUMN SEES a steady, finally a rapid, diminution in the bright show of flowers that has delighted our eyes and noses ever since spring.

The brightness has not all departed, however; it remains with us in the tawny gold of hawthorn and persimmon and false bittersweet, in the reds of coralberry and honeysuckle fruit, in the purples of wild grapes and woodbine berry and viburnum, in the gleaming white of the snowberry. Many of these persist after the last brilliant leaves have fallen from trees and shrubs, holding fast all winter, or until some hungry bird or squirrel nips them off.

That, of course, is the secret of their brightness. As the fair color and sweet scent of the flowers tempted bees, moths and other insects to sip nectar and thereby made possible the necessary function of pollination and fertilization, so the bright hues of the berries and fruits are invitations to animals, especially birds and mammals, to come and eat their fill and thereby disseminate and plant the seed.

That is what gives an advantage to those

Bright Invitations

shrubs and trees that keep at least a part of their fruit until deep into the winter: their offerings may be passed up in the abundance of autumn, but will be taken gladly when glazed snow covers the ground and food is harder to find.

Most of the bright fruits, no matter how diverse their botanical kinships, are alike in having a more or less pulpy flesh surrounding one or more hardcoated, indigestible seeds. The pulp is the reward for swallowing; the tough seed is constructed for survival through the vicissitudes of digestion, emerging finally undamaged and ready for germination when warmth and moisture give leave.

Indeed, it is quite probable that some seeds are even prepared for germination by the chemical action of their animal carriers' digestive juices on the resistant, impervious coats.

What the fruits may taste like to human tongues is no criterion of their acceptability to birds and other animals that may act as agents of distribution. Birds seem to have either no sense of taste or else a very strange one, for they will swallow without hesitation berries and small fruits that are bitter or nauseous to us, or at best insipid and tasteless.

If there is a little sugar or starch in the pulp that is all the bird or beast cares about. Niceties of flavor are luxuries that man can afford, but they are not for the hungry beaks and teeth of the snowy woods.

Science News Letter, September 6, 1952